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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/781,867	02/20/2004	Edward Colles Nevill	550-513	5181
23117	7590	05/05/2006	EXAMINER	
NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203			MCFADDEN, MICHAEL B	
			ART UNIT	PAPER NUMBER
			2188	

DATE MAILED: 05/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/781,867	Applicant(s) NEVILL, EDWARD COLLES	
	Examiner Michael B. McFadden	Art Unit 2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The instant application having Application No. 10/781867 has a total of 30 claims pending in the application, there are 3 independent claims and 27 dependent claims, all of which are ready for examination by the examiner.

I. INFORMATION CONCERNING OATH/DECLARATION

Oath/Declaration

2. The applicant's oath/declaration has been reviewed by the examiner and is found to conform to the requirements prescribed in 37 C.F.R. ' 1.63.

II. STATUS OF CLAIM FOR PRIORITY IN THE APPLICATION

3. As required by M.P.E.P. ' 201.14(c), acknowledgment is made of applicant's claim for priority based on an application filed on 26 March 2003.

III. INFORMATION CONCERNING DRAWINGS

Drawings

4. The applicant's drawings submitted 20 February 2004 are acceptable for examination purposes.

IV. ACKNOWLEDGEMENT OF REFERENCES CITED BY APPLICANT

Information Disclosure Statement

5. In an attempt to fulfill Applicant's duty to disclose information which is material to patentability according to 37 CFR 1.56, Applicants have submitted a large number of documents for the Examiner to consider. However, it appears from a cursory review of the documents that the vast majority of them are not material to patentability and should not have been submitted. In fact, the sheer number of documents creates an undue burden on the Examiner since if each document is material to patentability, each document must be carefully considered.

According to MPEP 609 (emphasis added): "Although a concise explanation of the relevance of the information is not required for English language information, applicants are encouraged to provide a concise explanation of why the English-language information is being submitted and how it is understood to be relevant. Concise explanations (especially those which point out the relevant pages and lines) are helpful to the Office, particularly where documents are lengthy and complex and applicant is aware of a section that is highly relevant to patentability or where a large number of documents are submitted and applicant is aware that one or more are highly relevant to patentability."

Additionally, Applicant is made aware of the court decision in Penn Yan Boats, Inc. v. Sea Lark Boats, Inc., et al., 175 USPQ 260 (DC SFla, 1972) which stated that "Applicant has obligation to call most pertinent prior patent to attention of Patent Office in a proper fashion and to attempt to patentably distinguish his claimed invention from disclosure of patent; failure to take these affirmative steps, particularly when coupled

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with misrepresentations made to the Patent Office, renders unenforceable the patent issued on his application." Apparently a good reference was buried in the mountain of prior art in the case and never pointed out by the Applicant.

Applicant is reminded that only documents which are "material to patentability" should be submitted. See 37 CFR 1.56 for definition of materiality.

Accordingly, none of the information disclosure statements has been considered. Applicant should submit a new IDS containing only those documents which are material to patentability, and Applicant should call Examiner's attention to particular passages and/or figures of particular documents. Resubmission of the previously submitted documents is not necessary.

V. OBJECTIONS TO THE APPLICATION

Claims

6. Claims 19 and 29 are objected to because of the following informalities: Both Claim 19 and 29 depend on Claim 1. The Office believes that this is a typographical error and that Claims 19 and 29 should depend on Claims 11 and 21 respectively. Appropriate correction is required.

VI. REJECTIONS NOT BASED ON PRIOR ART

Claim Rejections – 35 USC ' 101

7. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

8. Claims 11-20 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claims are directed toward a "computer program product" which is not statutory subject matter.

VII. REJECTIONS BASED ON PRIOR ART

Claim Rejections - 35 USC ' 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1-6, 9, 11-16, 19, 21-26, and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Wilson ("Uniprocessor Garbage Collection Techniques").

11. **Regarding Claim 1, 11, and 21**, Wilson discloses a method of controlling execution of a processing task within a processing system, said method comprising the steps of:

executing said processing task including allocating memory areas for data storage, and suspending an actual execution path of said processing task at an execution point to perform memory management said memory management comprising the steps of:

identifying one or more data items occurring in the course of execution and accessible to said processing task at said execution point which specify reference values pointing to respective ones of said memory areas (**graph of pointer relationships**); determining a correlation between reference values corresponding to identified data items and

memory areas allocated during said execution up to said execution point **(graph of pointer relationships)**; and performing a memory management operation on allocated memory areas in dependence upon said correlation. **(all citations from Wilson: Page 9, Section 2.2, Paragraph 1)**

12. **Regarding Claim 2, 12, and 22**, Wilson discloses wherein each of said one or more data items is an operand. **(Wilson: Page 5, Section 1.3)** **The paper makes the simplification that objects being collected are from the variety of types possible and that it is easy to determine the type of an object.**

13. **Regarding Claim 3, 13, and 23**, Wilson discloses wherein said identifying step comprises: identifying a possible execution path leading to said execution point, wherein said possible execution path may be different from said actual execution path; performing a simulated execution of said possible execution path; and wherein said one or more data items accessible to said processing task are identified by following said possible execution path to said current execution point. **Traversing the graph of pointer relationships, usually by either depth-first or breadth-first traversal.**
(Wilson: Page 9, Section 2.2, Paragraph 1)

14. **Regarding Claim 4, 14, and 24**, Wilson discloses wherein said memory management operation comprises marking all of said memory areas that are accessible to said processing task either directly or indirectly through said identified data items **(The objects that are reached are marked in some way; Wilson: Page 9, Section 2.2, Paragraph 1.)** and collecting unmarked memory areas for re-allocation during subsequent execution of said processing task. **(memory is swept ... find all**

unmarked objects and reclaim their space; Wilson: Page 9, Section 2.2, Paragraph 2)

15. **Regarding Claim 5, 15, and 25**, Wilson discloses wherein said memory management operation comprises compacting said unmarked memory areas prior to reallocation. **(Wilson: Page 10, Section 2.3, Lines 1-7)**

16. **Claims 6, 16, and 26 are rejected using the same rationale as claim 3.**

17. **Regarding Claim 9, 19, and 29**, Wilson discloses wherein said processing task is a component of a computer program written in an object-oriented programming language. **(Wilson: Page 2, Section 1, Lines 23-28)**

Claim Rejections - 35 USC ' 103

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

19. **Claims 10, 20, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilson ("Uniprocessor Garbage Collection Techniques").**

20. **Regarding Claim 10, 20, and 30**, Wilson fails to disclose wherein said object oriented programming language is Java.

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21. However, the Office takes Official Notice that it would have been obvious to a person of ordinary skill in the art to use Java as the object oriented programming language of Wilson.

22. The motivation for doing so would have been that Java allows the same program to be run on multiple operating systems, it contains built in support for networks, and it is a well understood and commonly accepted programming language among programmers.

23. Therefore, it would have been obvious to use Java as the object oriented programming language in Wilson for the benefits of allowing the program to run on multiple operating systems, containing built in support for networks, and being well understood and commonly accepted among programmers to obtain the invention as specified in claims 10, 20, and 30.

24. Claims 7, 8, 17, 18, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilson () as applied to claim 6 above, and further in view of Hosoya et al. ("Garbage Collection via Dynamic Type Inference" (herein after Hosoya)).

25. **Regarding Claims 7, 17, and 27** Wilson discloses scanning a plurality of program instructions corresponding to said programming task and logging a data type for each store instruction corresponding to each of said one or more data items; and simulating all possible execution paths up to said execution point for each of said one or more data items. **Traversing the graph of pointer relationships, usually by either depth-first or breadth-first traversal. (Wilson: Page 9, Section 2.2, Paragraph 1)**

Wilson fails to disclose categorizing at least one of said one or more data items as a multiple-type variable if different data types are logged for different store instructions for a respective data item; determining the data type associated with each multiple-type variable at each of said plurality of program instructions for each of said possible execution paths; and checking said determined data type for each of said multiple-type variables at one of said plurality of program instructions corresponding to said current execution point; and said memory management operation is performed in dependence upon a result of said step of checking said determined data type.

Hosoya discloses categorizing at least one of said one or more data items as a multiple-type variable if different data types are logged for different store instructions for a respective data item; determining the data type associated with each multiple-type variable at each of said plurality of program instructions for each of said possible execution paths; and checking said determined data type for each of said multiple-type variables at one of said plurality of program instructions corresponding to said current execution point; and said memory management operation is performed in dependence upon a result of said step of checking said determined data type. **(Hosoya: Abstract, Lines 2-6 and Page 216, Lines 3-11)**

Wilson and Hosoya are analogous art because they are from the same field of endeavor, garbage collection.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to combine the type inference garbage collection of Hosoya into the garbage collection techniques of Wilson.

The motivation for doing so would have been that the garbage collection technique of Hosoya collects more garbage than any other algorithm using the same type system does. **(Hosoya: Page 233, Section 9, Lines 4-7)**

Therefore, it would have been obvious to combine the type inference garbage collection of Hosoya into the garbage collection techniques of Wilson for the benefit of collecting more garbage than any other algorithm using the same type system does to obtain the invention as specified in claims 17, 18, and 19.

26. **Regarding Claims 8, 18, and 28**, Wilson fails to disclose wherein said memory management operation involves tagging said data item as suitable for reallocation if said determined data type is different for different ones of said possible execution paths at said current execution point.

Hosoya discloses wherein said memory management operation involves tagging said data item as suitable for reallocation if said determined data type is different for different ones of said possible execution paths at said current execution point. **(Hosoya: Abstract, Lines 2-6 and Section 1, Lines 1-5) Where Hosoya does not specifically say that semantic garbage will be reallocated it is understood that when speaking about garbage collection, garbage will be collected and reallocated.**

VIII. RELEVANT ART CITED BY THE EXAMINER

27. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

The following references teach garbage collection techniques accompanied by dynamic type variables:

Holloway et al.	US Patent No. 4,922,414
Cocchi et al.	US Patent No. 6,442,751
Turner	US Patent No. 6,212,612
Chase et al.	US Patent No. 6,149,318
Tremblay et al.	US Patent No. 6,125,439
Harris et al.	US Patent No. 5,873,097
Austin	US Patent No. 5,644,709

IX. CLOSING COMMENTS

Conclusion

a. STATUS OF CLAIMS IN THE APPLICATION

28. The following is a summary of the treatment and status of all claims in the application as recommended by M.P.E.P. '707:07(i):

a(4). CLAIMS REJECTED IN THE APPLICATION

29. Per the instant office action, claims 1-30 have received a first action on the merits and are subject of a first action non-final.

b. DIRECTION OF FUTURE CORRESPONDENCES

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30. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael B. McFadden whose telephone number is (571)272-8013. The examiner can normally be reached on Monday-Friday 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Manorama Padmanabhan can be reached on (571)272-4210. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

IMPORTANT NOTE

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MBM
4/25/2006

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5/1/06
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